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TWO NEW SPECIES OF *ASYNDETUS* LOEW, AND NOTES ON THE IDENTITY OF *A. INTERRUPTUS* LOEW (DIPTERA: DOLICHOPODIDAE)

HAROLD ROBINSON AND MARK DEYRUP

(HR) Department of Botany, National Museum of Natural History, Smithsonian Institution, MRC 166, Washington, DC 20560, U.S.A.; (MD) Archbold Biological Station, P.O. Box 2057, Lake Placid, FL 33862, U.S.A.

Abstract.—***Asyndetus archboldi*** is described as new from the sand hills of peninsular Florida; ***A. wirthi*** is described from Jamaican and Antiguan material previously determined as *A. interruptus*. Observations are given on the type specimen of *A. interruptus* Loew in Havana, Cuba.

Key Words: *Asyndetus,* new species, Dolichopodidae, Florida, West Indies

Two new species of *Asyndetus* Loew are described, the first based on collections from the xeric uplands of Florida, and the second based on West Indian material previously identified as *A. interruptus* Loew.

The Florida *Asyndetus* is described and discussed as part of an effort to catalog the species of arthropods found in the Florida Scrub habitat. Florida scrub is a fire-maintained habitat that occurs on xeric sand ridges in scattered localities in Florida. The scrub habitat supports a number of species of plants and animals found nowhere else, and the rapid disappearance and degradation of the remaining areas lends an urgency to the project of cataloguing the resident arthropods. For more detailed descriptions of Florida scrub, see Myers (1990) and Abrahamson et al. (1984); for more information on Florida scrub arthropods, see Deyrup (1990) and Deyrup and Eisner (1993).

All specimens are presently deposited at either the National Museum of Natural History, Smithsonian Institution, (USNM) or the Archbold Biological Station (ABS).

Asyndetus archboldi Robinson and Deyrup, new species

(Figs. 1–3)

Holotype male.—Length 1.9 mm; wing 1.6 mm by 0.6 mm. Face 1.4 times longer than wide, sides parallel; face and front with dense silvery pollen. Palpus black, with several stout black setae; proboscis black; upper postocular setae black, lower postocular setae white. Antenna black, scape widened apically, without hairs or setae; pedicel about twice as long dorsally as ventrally in external lateral view, with a dorsal apical enlarged black seta; 1st flagellomere with a long, dorsal, sub-basal arista, encircled by a deep groove just distad of arista, so flagellomere appears divided into 2 parts.

Thorax dark gray with light gray pollen, with extremely faint greenish and coppery reflections when viewed in fluorescent light, with both green and coppery reflections conspicuous in incandescent light; all setae black; only 4 acrostichals in single irregular row, 4 pairs of dorsocentrals; 2 large scutellar bristles; 1 black proepisternal seta above fore coxa.

Coxa black, front and middle coxa with an anterolateral irregular row of bristles, hind coxa with an external basal bristle; femora black with conspicuous green reflections and yellowish apices; front and middle tibiae yellowish, hind tibia and all tarsi black; hairs and setae on legs black; middle and front tibiae with small seriate setae and single enlarged apical seta, hind tibia with paired anterodorsals and posterodorsals at basal fifth, at two-thirds and subapically; an unpaired anterodorsal at basal third. Front basitarsus with a subapical external cluster of small thick setae; 2nd, 3rd and 4th segments compressed, 5th segment depressed; pulvilli about as long as rest of 5th segment, claws about half as long as pulvilli, shorter than 3 apical bristles of 5th segment; lengths of tarsal segments from base: tarsus I, 0.30, 0.09, 0.06, 0.04, 0.05 mm, pulvilli 0.05 mm; tarsus II, 0.35, 0.16, 0.11, 0.08, 0.08 mm, pulvilli 0.03 mm; tarsus III, 0.25, 0.18, 0.12, 0.08, 0.08 mm, pulvilli 0.02 mm.

Wings appearing rather smoky due to dense, uniform microtrichae; veins dark brown; costa ending at apex of 3rd vein; 4th vein discontinuous, the "broken" ends apparently overlapping, at least as folds; calypter, its setae, and knob of halter, ivory.

Abdomen dark gray with thin gray pollen, with greenish and coppery reflections that are almost imperceptible in fluorescent light, conspicuous in incandescent light. Tergal setae black, suberect, apical band on each tergite larger; genital capsule with 4 large equal setae.

Allotype female.—Length 2.2 mm; wing 2.0 mm by 0.7 mm. Coloration, pollinosity, wing venation, tibial setae similar to male. Front tarsi not modified, setae of tergites shorter and more decumbent.

Holotype.—Male: FLORIDA: Highlands Co., Archbold Biological Station, 26 April 1996, M. Deyrup. On open sand at edge of fire lane, Florida scrub habitat (USNM).

Paratypes.—(USNM): 6 ♂, 3 ♀ (including allotype): same locality, date, collector, habitat as holotype; 1 ♀: same locality, collector as holotype, 30 Apr. 1989, road 6, scrubby flatwoods; 2 ♀: same locality, collector as holotype, 23 June 1989, white sand trail, scrub; 1 ♀: same locality, collector as holotype, 29 June 1989, white sand fire lane; 1 ♂, 1 ♀; 4 ♂, 15 ♀, same locality, collector as holotype, 16 June 1992, *inopina* scrub, line road; 1 ♂, 8 ♀: same locality, collector as holotype, 18 June 1992; 3 ♂, 3 ♀: same locality, collector as holotype, 19 June 1992; 1 ♂: same locality, collector, habitat as holotype, 18 Apr. 1996; 3 ♂, 7 ♀: same locality, collector, habitat as holotype, 23 Apr. 1996; 2 ♂, 1 ♀: same locality, collector, habitat as holotype, 24 Apr. 1996; 1 ♂: Lake Placid, Placid Lakes Development, 15 June 1992, M. Deyrup; same locality as holotype, 26 June 1989, R. Shumate, Malaise trap, *Ceratiola* area. (ABS): 9 ♂, 7 ♀: same locality, collector, habitat as holotype, 1 May 1996.

Etymology.—Named for the Archbold Biological Station, where most of the type material was collected.

Diagnosis.—Because of the pale fore tibia, black hind tibia, and the male face that is higher than wide, *Asyndetus archboldi* keys in Robinson (1964) to couplet 6, but differs from all the species in that part of the key by the small first flagellomere of the antenna. Relationship might be closest to some western species, particularly *A. latus* Van Duzee, from Bill Williams Fork, Arizona, having a similar densely silvery pollinose face and black palpi. The latter species is distinctly larger, ca. 3.5 mm long, is evidently from near water, and resembles other possibly related western species in having all the tibiae partly or wholly yellow (Van Duzee 1916, 1919).

Discussion.—Florida scrub habitat is the antithesis of habitats preferred by most Dolichopodidae: it is comparatively sterile, xeric, without nearby permanent water, with clumps of sclerophyllous, drought-adapted plants, and patches of bare, white sand. Other species of *Asyndetus* are usually found on the seacoast or around permanent fresh water (Cole 1969). However, *A. arch-*

boldi shares a habitat trait with some of its congeners: it is associated with sandy places. This is somewhat parallel to the situation in pygmy mole crickets (Tridactylidae) which live on algae growing in wet, sandy areas, except for a newly described species from Florida scrub (Deyrup and Eisner 1996). This latter pygmy mole cricket feeds on a recently discovered layer of algae that grows about 3 mm below the surface of the bare sand, where light is easily transmitted through the translucent grains and where atmospheric drying is much reduced. The larvae are known for only one species of *Asyndetus* (Williams 1938), that naturally occurs at the entrances of crab holes on sandy beaches, and whose larvae have been raised in vials where they were fed on drosophilid maggots. Almost all dolichopodid larvae are similarly predacious, but the animals on which they feed occur in a wide variety of habitats. At least some dolichopodid larvae are associated with algal mats (Oldroyd 1964). Thus, we speculate that the larvae of *A. archboldi* may be feeding in the algal layer under the sand on which the adults are found. The limited literature on dolichopid larvae and pupae (Willams 1938; Smith 1952; Dyte 1959; Robinson and Vockeroth 1981) would be augmented by discovery and description of the immature stages of *A. archboldi.*

Adults of *Asyndetus archboldi* occur on open sand at edges of fire lanes and in bare patches between clumps of scrub plants. These flies move quickly from place to place on the sand, seldom flying more than a few mm above the surface. They may perch for a few minutes on debris, especially the small dead leaves of scrub oaks. When individuals meet, they usually perform a rapid gyrating flight around each other, then separate. A fly can be captured by quickly placing a plastic bag over it, then chasing it up into the bag, where it can be sucked up with an aspirator. We have collected one specimen in a Malaise trap, but there seems to be no method for easily capturing large numbers of specimens at one time. We expect that, when dipterists begin to scan the surface of open sand for these tiny flies, that this species or similar species will be found in scrub elsewhere in Florida, and perhaps outside of the state as well.

Asyndetus wirthi Robinson, new species
(Figs. 4–6)

Holotype male.—Length 4.0 mm; wing 3.5 mm by 1.2 mm. Face ca. ¾ to $^4/_5$ as wide as high, not recessed, white pollinose; front not noticeably wider than face at antennae, metallic greenish color almost totally obscured by grayish-white pollen. Palpus and proboscis black, the former with numerous black setae. Antenna black; pedicel only slightly produced above and on inner side, not longer above than below; first flagellomere scarcely as long as high, with very short, blunt point below arista, arista borne at distal ¼ of upper edge, very near tip. Lower postocular setae white.

Thorax mostly metallic green obscured with yellowish-gray pollen, with rather distinct brown pollinose stripe dorsally between rows of dorsocentrals; acrostichals distinctly biseriate; scutellum with small hair on lateral margin; with series of 5 or 6 small proepisternal setae above fore coxa of which those nearest the coxa are longer.

Legs dark, with some yellow at knees; coxae and femora metallic green with grayish pollen. Setae on anterior surfaces of coxae coarse, black. All femora with somewhat irregular series of anteroventral and posteroventral setae, half to three-fourths as long as widths of femora, a stouter anteroventral seta at tip of hind femur, 2 or 3 longer setae anterodorsally near tip of hind femur. Fore tibia with 2 or 3 anterodorsals, third and largest anterodorsal near middle, 1 distinct posterodorsal near middle, 2 small apicals above and below; middle tibia with 2 large anterior bristles near $^1/_5$ and $^3/_5$, small anterodorsal near $^2/_5$, 3 rather small posterodorsals near $^1/_5$, $^2/_5$, and $^3/_5$, 1 distinct ventral near ¾ and sometimes 1 smaller

near ⅖, usually 5 large apicals; hind tibia with 7 anterodorsdals of irregular lengths staggered in 2 rows, basal in series very small, the second, fourth and sixth in a more anterior row and slightly larger, with 6 posterodorsals, the third and fifth large, near ⅖ and ¾, with 5 large apicals. Tarsus with last segment slightly broadened, all pulvilli enlarged and longer than 5th segment, fore tarsus slightly felted ventrally, middle basitarsus with only a few ventral spicules; lengths of tarsal segments from the base as: tarsus I, 0.52, 0.22, 0.17, 0.13, 0.17 mm, pulvilli 0.26 mm; tarsus II, 0.65, 0.35, 0.22, 0.17, 0.13 mm, pulvilli 0.24 mm; tarsus III, 0.48, 0.43, 0.30, 0.17, 0.13 mm, pulvilli 0.20 mm.

Wings grayish with yellowish-brown veins; anal margin fully rounded. Vein 1 reaching costa near middle of wing; vein 3 distinctly curved backward near tip; last part of vein 4 broken at bend, broken ends apparently slightly overlapping. Crossvein ¼ as long as terminal section of vein 5. Calypter, its setae and knob of halter whitish.

Abdomen metallic green dulled with gray pollen; hairs mostly short, hairs on sides and sternites longer, marginal setae 2 or 3 times as long as dorsal hairs. Genital capsule dark brown, bearing 4 stout bristles posteriorly.

Allotype female.—Length 4.0–4.5 mm; wing 3.5–3.9 mm by 1.3 mm. Face slightly higher than in male, with narrow clypeus visible; antenna as in male. Fore and middle coxae with setae less coarse anteriorly; femora without long setae or bristles below; hind tibia with small anteroventrals; last segments of tarsi not broader, pulvilli not enlarged.

Holotype.—Male, JAMAICA: Falmouth, bay shore, 1 March 1969, W. W. Wirth (USNM).

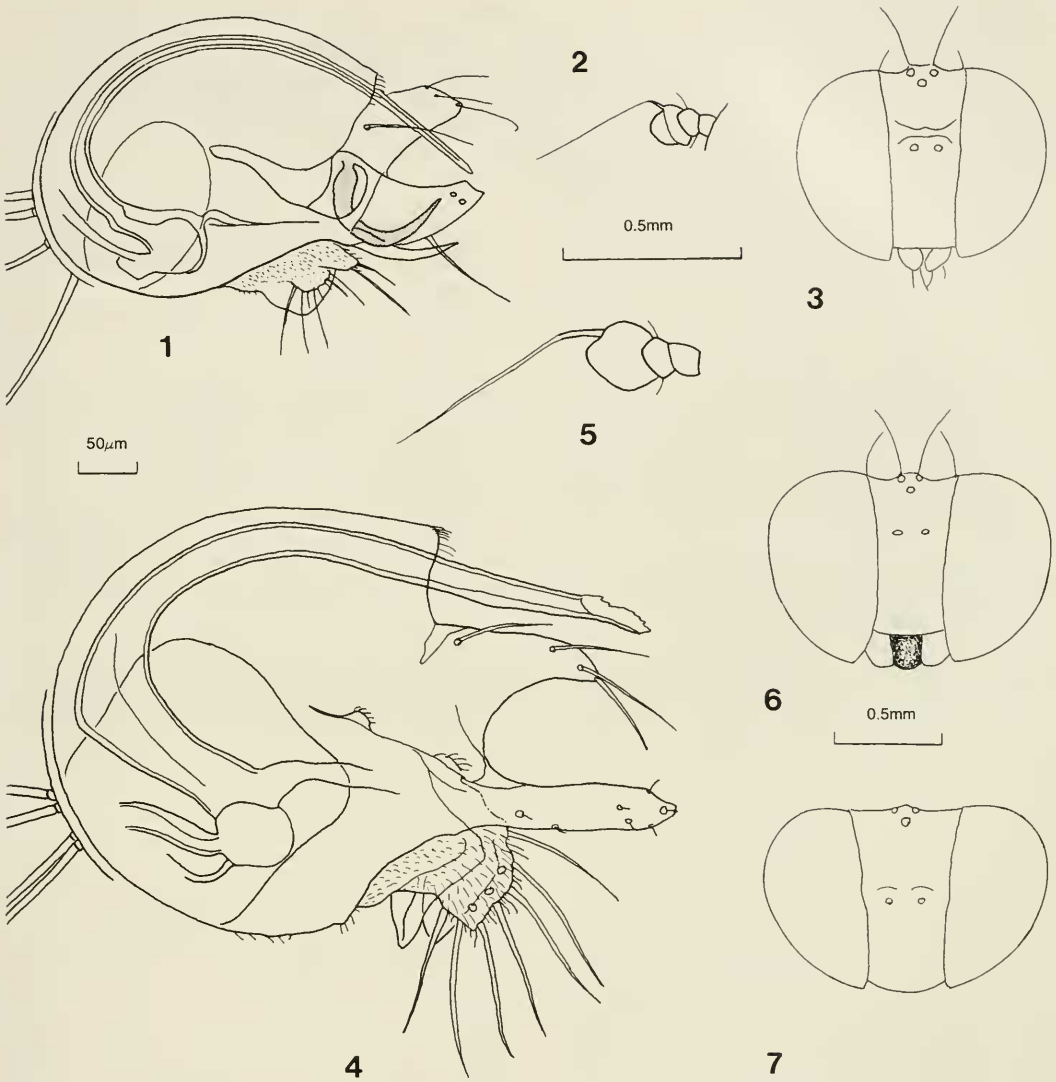
Paratypes.—3 ♂, 3 ♀ (including allotype): same locality, date, collector, habitat as holotype; 1 ♂, ANTIGUA: Dutchman Bay, 1 March 1969, W. W. Wirth (all USNM).

Etymology.—The species is named for the collector, the late Willis W. Wirth of the Systematic Entomology Laboratory, Diptera section of the U.S. Department of Agriculture.

Diagnosis.—*Asyndetus wirthi* differs from *A. interruptus* by the face of the male being higher than wide, very gradually narrowed from the front rather than having a slight but abrupt narrowing at the level of the antennae (Figs. 6, 7). The pedicel of the antenna has the upper edge scarcely longer than the lower edge, the first flagellomere is scarcely as long as high with a very short blunt point ventral to the arista, and the mesoscutum has brownish pollen between the rows of dorsocentrals. *Asyndetus interruptus* has the pedicel of the antenna distinctly longer above than below, the first flagellomere is swollen at the base with the lower edge oblique to a short and sometimes sharp point, and the mesoscutum is evenly grayish or whitish pollinose above.

Discussion.—The distinction between *Asyndetus wirthi* and *Asyndetus interruptus* Loew was first made by Robinson (1975). Unfortunately, at that time, *A. wirthi* was thought to be *A. interruptus,* and specimens of *A. interruptus* were described as a new species, *A. bredini.* The confusion was the direct result of inadequate knowledge of the type specimen of *A. interruptus,* supposedly deposited in the Poey collection in Havana, Cuba. The type was said to be in a sealed tray.

In 1990, this situation was resolved through a correspondent in Cuba, Gabriel Garcea G., who sent photographs of the type specimen. Garcea reported that the type was in the Gundlach collection of the Ecology-Systematics Institute, Academy of Sciences, in Havana, not in the Poey collection. The specimen is a male, with the genital capsule nearly hidden within the tip of the abdomen. The antennae are now missing from the type as depicted in the photographs, and the colors were said to be faded, but the head is present, and the frontal and facial shapes can be seen. The face is square, not higher than wide, the form previously cited for *A. bredini* Robinson



Figs. 1–7. *Asyndetus.* 1–3, *A. archboldi.* 1, Genital capsule. 2, Antenna. 3, Head showing face and front. 4–6, *A. wirthi.* 4, Genital capsule. 5, Antenna. 6, Head showing face and front. 7, *A. interruptus,* head showing face and front. 1, 4, 50 μm scale. 2–5, Upper 0.5 mm scale. 6, Lower 0.5 mm scale. 7, Drawn from photograph of type specimen, seen from slightly above.

(1975). *Asyndetus bredini* is a synonym of *A. interruptus,* and the material described as *A. interruptus* in 1975 is described here as a new species.

Both *Asyndetus wirthi* and *A. interruptus* are found along seashores of the Gulf of Mexico and Caribbean area, a habitat that is common in the genus. The new species is described strictly from Jamaica and Antigua, but it is presumed to occur more widely. A female, that may be this species, has been seen from Quintana Roo, Mexico. *Asyndetus interruptus* is known from Florida, Cuba and Dominica.

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Literature Cited

Abrahamson, W. G., A. F. Johnson, J. N. Layne, and P. A. Peroni. 1984. Vegetation of the Archbold Biological Station, Florida: an example of the southern Lake Wales Ridge. Florida Scientist 47: 209–250.

Cole, F. R. 1969. The flies of western North America. University of California Press, Berkeley. 693 pp.

Deyrup, M. 1990. Arthropod footprints in the sands of time. Florida Entomologist 73: 529–538.

Deyrup, M. and T. Eisner. 1993. Last stand in the sand. Natural History 102: 42–47.

———. 1996. Description and natural history of a new pygmy mole cricket from relict xeric uplands of Florida (Orthoptera: Tridactylidae). Memoirs of the Entomological Society of Washington 17: 59–67.

Dyte, C. E. 1959. Some interesting habits of larval Dolichopodidae (Diptera). Entomologists Monthly Magazine 95: 139–143.

Myers, R. L. 1990. Scrub and high pine, pp. 150–193. *In* Myers, R. L. and T. T. Ewel, eds. Ecosystems of Florida. University of Central Florida Press, Orlando. 765 pp.

Oldroyd, H. 1964. The natural history of flies. W. W. Norton and Company, New York. 324 pp.

Robinson, H. 1964. A synopsis of the Dolichopodidae (Diptera) of the southeastern United States and adjacent regions. Miscellaneous Publications of the Entomological Society of America 4: 103–192.

———. 1975. Bredin-Archbold-Smithsonian biological survey of Dominica, the family Dolichopodidae with some related Antillean and Panamanian species (Diptera). Smithsonian Contributions to Zoology 185: i–iv, 1–141.

Robinson, H. and J. R. Vockeroth. 1981. Dolichopodidae, pp. 625–639. *In* Manual of Nearctic Diptera. 1: i–vi, 1–674.

Smith, M. E. 1952. Immature stages of the marine fly, *Hypocharassus pruinosus* Wh., with a review of the biology of immature Dolichopodidae. American Midland Naturalist 48: 421–432.

Van Duzee, M. C. 1916. Table of males of the North American species of the genus *Asyndetus* with descriptions of six new species. Psyche 28: 88–94.

———. 1919. Two new *Asyndetus*, with a table of North American species. Entomological News 30: 248–250.

Williams, F. X. 1938. *Asyndetus carcinophilus* Parent (Diptera, Dolichopodidae). Proceedings of the Hawaiian Entomological Society 10: 126–129.